HAZARDOUS AND TOXIC AIR POLLUTANTS, Max Sanfield, Environmental Protection Agency, Research Triangle Park, North Carolina 27711

Background and current state of knowledge with regard to hazardous and toxic air pollutants are reviewed. Secondary pollutants formed from the interaction of primary pollutants are likely to be the major hazard. Their formation and biological effects are discussed. The need for a uniform strategy and a realistic cost/risk/benefit analysis of the problem is pointed out.

A LOOK AT THE ENVIRONMENTAL ASPECTS OF COAL CONVERSION, R. R. Bertrand,
Exxon Research and Engineering Company, Linden, N.J. 07036

Several processes, either currently in operation or in the development stage, offer significant prospects for conversion of coal into relatively clean gaseous or liquid fuels. The scale of these processes needed for economic viability, likewise suggest a potential for significant environmental degradations in the immediate neighborhood of the conversion facility. The magnitude of the environmental aspects of coal conversion facilities will be assessed not only in terms of absolute potential but also in terms of likely effluent discharges based on application of demonstrated control technology. These assessments will draw heavily on an on-going study being conducted for the Environmental Protection Agency; a study that has involved discussion with process developers, plant visits and a detailed analysis of the probable environmental effluents from several coal conversion processes. A comparison will also be made of the probable magnitude of effluent discharges to be expected from coal conversion processes relative to those from alternate processes using coal and other fossil fuels for production of equivalent quantities of clean energy.

POTENTIALLY VOLATILE TRACE ELEMENTS IN COAL.* R. R. Ruch, J. K. Kuhn, G. B. Dreher, J. Thomas Jr., Joyce K. Frost, and R. A. Cahill, Illinois State Geological Survey, Urbana, IL 61801.

Most of the following trace and minor elements have been determined in over 100 U. S. whole coals and 34 specific gravity fractions of coal: As, Ag, Au, B, Ba, Be, Bi, Br, Cd, Cl, Co, Cr, Cu, F, Ga, Ge, In, Pb, Mn, Mo, Ni, Hg, Hf, P, Rb, Ru, Sb, Se, Sn, Sr, Ta, Te, Th, Tl, U, V, W, Zn, Zr,and some rare earths. A combination of analytical techniques, including atomic absorption, X-ray fluorescence, optical emission, neutron activation, and ion-selective electrode, have been adopted, compared, and utilized. A summary of the sampling, sample pretreatment, and analyses procedures employed with preliminary results and interpretation, will be presented.

*Sponsored in part by U. S. EPA Contract 68-02-1472

POLLUTANTS IN GASIFICATION, A. Attari, Institute of Gas Technology, Chicago, Illinois

INTERACTIONS BETWEEN HYDRODESULFURIZATION AND HYDRODENITROGENATION REACTIONS

by

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ABSTRACT

Interactions between the hydrodesulfurization (HDS) of thiophene and the hydrodenitrogenation (HDN) of pyridine on commercial CoMo, NiMo and NiW sulfided catalysts were studied using a flow microreactor at pressures up to 11.1 atm and temperatures up to 425°C.

Pyridine HDN is more difficult than thiophene HDS, and above 350°C there is a thermodynamic limitation on the first step of the HDN reaction mechanism, in which the pyridine ring is saturated to piperidine. Sulfur compounds have a dual effect on HDN. At low temperatures, thiophene inhibits the reaction, which is postulated to occur by competion with pyridine for hydrogenation sites on the catalyst, retarding the hydrogenation of pyridine to piperidine, and thus reducing the overall reaction rate. At high temperatures sulfur compounds enhance HDN. It is suggested that the dominant effect here is interaction of hydrogen sulfide, an HDS reaction product, with the catalyst to improve its activity for rupture of the C-N bond. This increases the rate of reaction of piperidine, which is rate-determining at the latter conditions, and enhances the overall rate of HDN.